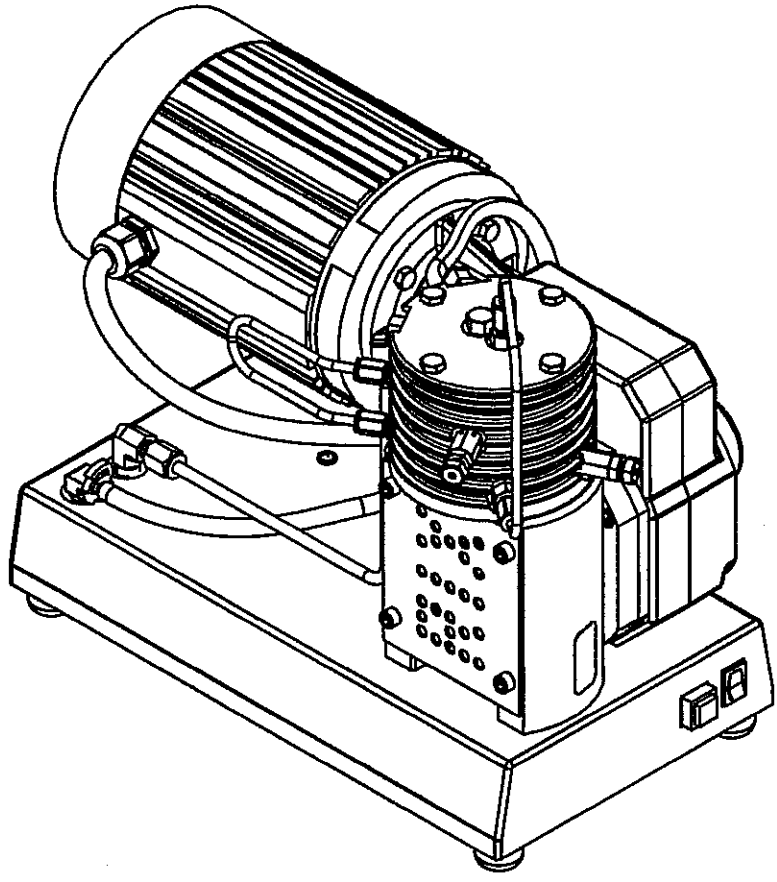
# RIX
# COMPRESSORS

## MICROBOOST
## Owner's Manual

**MB-115**
**MB-230**



**February 19, 2004**
APPLICABILITY [CD]

# WARNING!!!

To prevent FIRE, SERIOUS INJURY and/or DEATH, it is the User's responsibility to ensure that all parts used in the compression assembly and gas plumbing of a RIX Oxygen or Nitrox compressor are cleaned for oxygen service. Cleaning should be in accordance with Compressed Gas Association G-4.1. Factory oxygen cleaned parts are denoted by an "X" prefix at the beginning of the part number. It is the Buyers responsibility to maintain the cleanliness of factory-cleaned parts throughout installation and start-up.

Furthermore, non-factory supplied parts will void all warranties, as improper materials can cause oxygen fires resulting in serious fires injury and/or death.

# FOR ALL REPAIRS:

1) Refer to the applicable service manual for assembly instructions
2) Refer to applicable compressor start-up instructions after all repairs

# INTRODUCTION

Congratulations on your purchase of the Rix Microboost compressor. We anticipate that with proper care you will get many years of satisfactory performance from this compressor.

This manual is prepared to help you operate this equipment safely and so that you get the most benefit from this package. Please read it carefully.

This equipment is protected by warranty, a copy of which should have been provided separately by your dealer. We suggest that you read the warranty policy to fully understand your coverage and your responsibilities of ownership.

Rix recommends that all servicing be done by trained and qualified personnel. Rix recommends that you contact our offices at 707-747-5900 for a list of qualified service centers.

Rix Industries
4900 industrial Way
Benicia, CA 94510
Phone (707) 747-5900
Fax (707) 747-9200

# INTRODUCTION

## Safety

This electromechanical equipment is designed to produce high pressure gas. Operating personnel must follow these safety requirements at all times to avoid injury to personnel or damage to property.

Keep away from live circuits. Do not attempt to replace components or make adjustments unless the power to the compressor has been disconnected and all pressure relieved.

Never operate with safety devices removed or disabled. This includes guards for moving objects, protection from high temperature surfaces, pressure relief valves, pressure switches, or covers over electrical components.

When compressing oxygen it is critical that surfaces in contact with oxygen be kept clean and free from contamination, especially hydrocarbon contamination or any flammable material. This compressor is shipped oxygen clean and must be maintained that way to avoid the hazard of explosion or fire.

Safety warnings are provided in a variety of forms, including:
Safety Labels-located on the equipment
Safety Messages- provided in this manual and proceeded by a safety alert label, DANGER, WARNING, CAUTION, and NOTE.

**DANGER** You will likely be killed or seriously hurt if you don't follow instructions, and equipment damage is certain.

**WARNING** You may be killed or seriously hurt if you don't follow instructions, and equipment damage is certain.

**CAUTION** You can be hurt if you don't follow instructions, and equipment damage is likely.

**NOTE** Highlights a certain operation, maintenance condition, or statement, which is useful but not associated with a known hazard, as indicated by a warning or caution.

# CONTENTS

Introduction.....1

Performance.....4

Safety.....5

Controls and features.....6

Installation.....8

Operation.....10

Servicing.....11

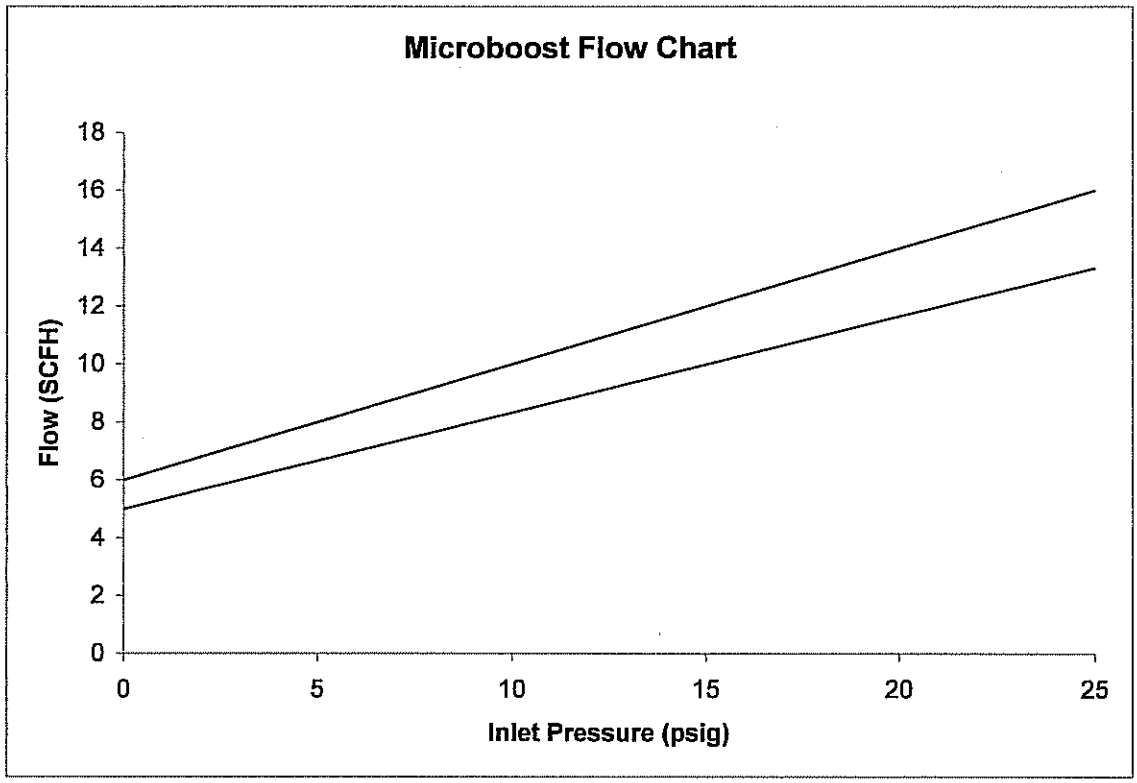
Troubleshooting.....13

Parts.....14

Technical Data.....20

# PERFORMANCE

The Microboost Compressor is designed to take oxygen at 0-25 psig and compress it to 2200 psig. The discharge flow rate varies with inlet pressure according to the chart below:




Top line 60 Hz flow
Bottom line 50 Hz flow

| | |
|---|---|
| Inlet Pressure Range | 0-25 psig |
| Discharge Pressure Range | 0-2200 psig |

This compressor is designed to compress clean, dry, oxygen or nitrogen. For other gasses contact Rix Industries.

**DANGER**

Keep away from live circuits. Do not attempt to replace components or make adjustments unless the power to the compressor has been disconnected and all pressure relieved.

**DANGER**

Never operate with safety devices removed, modified, or disabled. This includes guards for moving objects, protection from high temperatures surfaces, pressure relief valves, or covers over electrical components.

**WARNING**

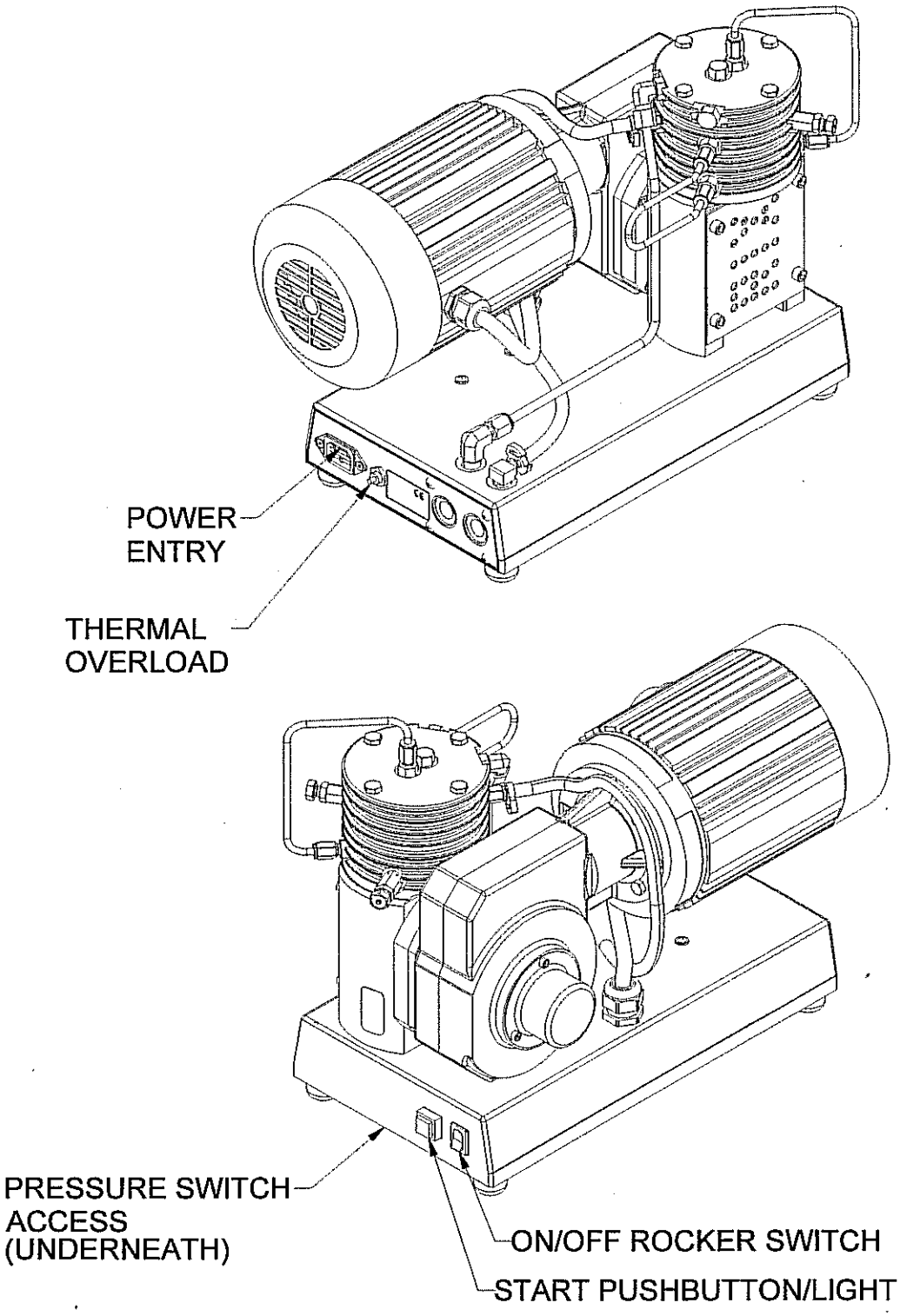
Surfaces on the motor and compressor can become hot and may cause pain or discomfort when touched. Allow the equipment to cool before handling it.

**DANGER**

To prevent **FIRE, SERIOUS INJURY, and/or DEATH**, it is the User's responsibility to ensure that all parts used in the compression assembly and gas plumbing of this Rix Oxygen compressor and any other portions of the gas stream that may be exposed during the installation of new or replacement parts are cleaned for Oxygen Service prior to installation.
Any work to be done on the compressor where the gas stream may be exposed must be done in accordance with **safe Oxygen Equipment handling procedures.**
No attempt should be made to work on the machine without full knowledge of Oxygen handling equipment handling and the potential hazards of contamination.
Factory oxygen cleaned parts are denoted by an "X" prefix at the beginning of the part number. It is the User's responsibility to maintain the cleanliness of factory cleaned parts and any other existing portions of the gas stream that may be exposed during the initial installation, start-up, or during installation of replacement parts.

**Rix Industries recommends the customer establish a procedure for working with oxygen machinery. Refer to Compressed Gas Association, Inc. publication number CGA G-4.1, Cleaning Equipment for Oxygen Service.**

# CONTROLS AND FEATURES



**Power Entry Module-** The Microboost is connected to a source of power using a power cord connected to the Power Entry Module (conforming to IEC-320-C13). A power cord suitable for the intended voltage, 115 VAC or 230 VAC, at 10 amps should be used to connect the Microboost to the source of power.

**Overload-** The pushbutton reset overload is provided to protect the equipment if the motor current draw exceeds 10 amps. A separate automatic reset thermal switch is located inside the motor to protect the motor from overheating.

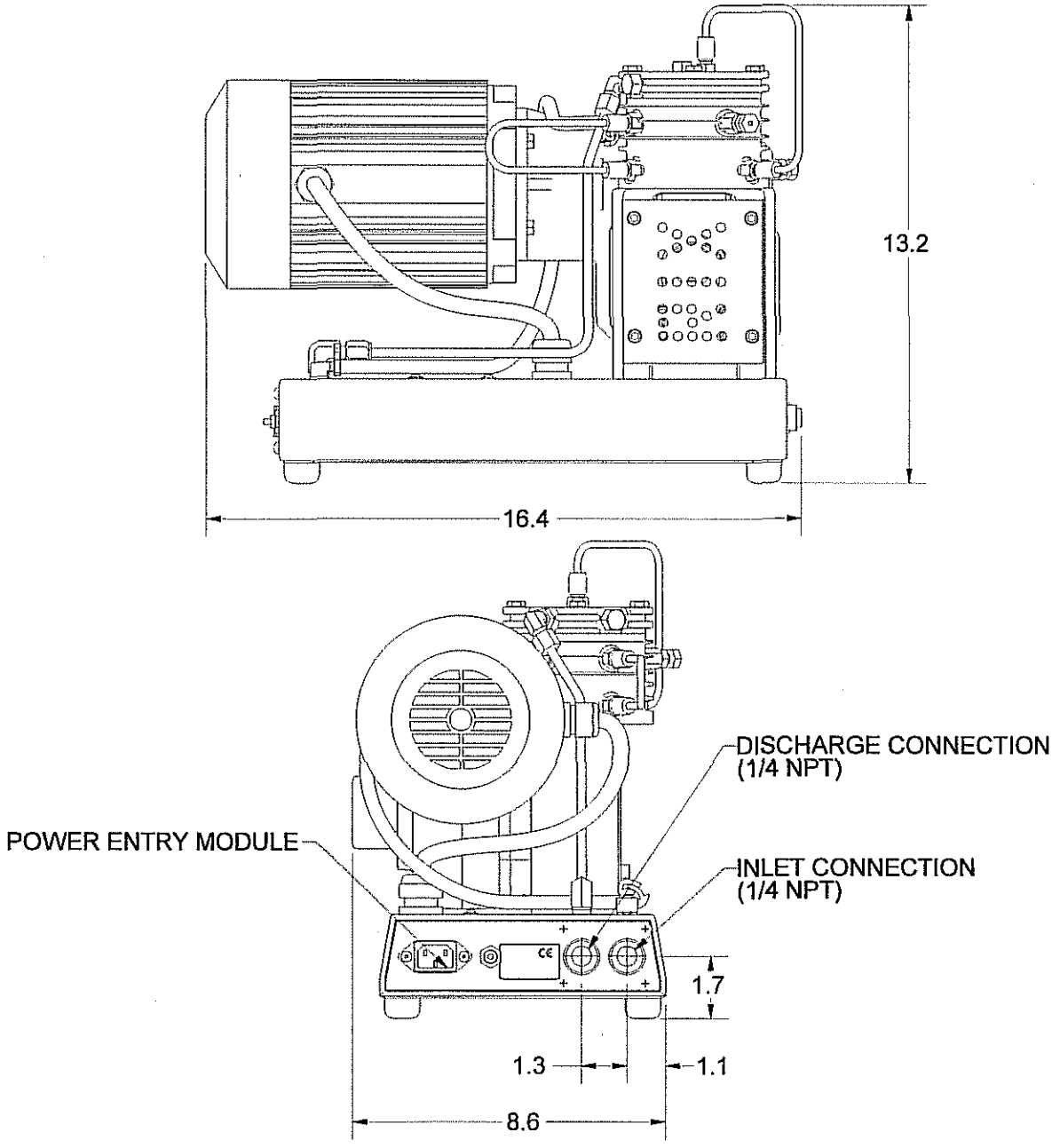
**Power On/Off Rocker Switch-** The rocker switch is used to turn power on to the Microboost control system. This switch is also used to stop the unit manually when it is running.

**Start Pushbutton-** The momentary lighted pushbutton is provided for starting the compressor. With the unit plugged into a source of electric power and the On/Off rocker switch in the On position the Start Pushbutton can be pressed to start the compressor motor. The compressor runs until the pressure switch signals it to stop or until the On/Off rocker switch is switched Off.

**Pressure Switch-** The pressure switch is provided to automatically stop the compressor when the set pressure is reached. This is usually factory set at 2200 psig. The switch is located inside the Microboost base and is accessible for adjusting through a rectangular opening provided in the underside cover.

**Relief Valves-** Relief valves are provided for all compression stages. The first stage (set at 350 psig) and second stage (set at 1200 psig) relief valves are located on the outside of the compressor as shown. The third stage relief valve (set at 2400 psig) is located inside the compressor base. These prevent pressures from rising to levels that might cause damage.

# INSTALLATION



# INSTALLATION

The Microboost is a free standing package weighing 61 lbs and is meant to be located in open air on a table, shelf, or on the floor. It may also be mounted inside a frame or cabinet as long as sufficient air circulation is provided to prevent overheating. Locate the compressor in an area with good ventilation. An ambient temperature of 90° F or less is preferable. Circulating air across the compressor with an external fan will make it operate better and last longer.

Rix recommends installing a flow check valve after the Microboost discharge to prevent reverse flow when the compressor is off.

Pressure gauges should be installed at the suction and discharge to help in monitoring performance and for troubleshooting.

Plug into a source of power that is protected for 15 amps (115 V) or 10 amps (230 V).

Connect the compressor inlet to a source of clean, dry gas regulated not to exceed 25 psig. Inlet filtration to 2 micron max particle size is recommended. Particle contamination can cause failure.

Connect the compressor discharge to a high pressure cylinder or manifold designed to handle pressures at 2300 psig. A discharge filter of at least 5 micron is recommended to remove seal wear (Teflon) particles. The customer is responsible for designing and adequately protecting the plumbing and equipment he attaches to the Microboost.

**CAUTION**

Exposed surfaces of the operating motor and compressor can reach 180° F and may cause pain or discomfort if touched. Locate the unit in a safe location where it is protected from human contact.

# OPERATION

Check that power is connected to the Microboost.

Check that the compressor suction is connected to a source of clean, dry oxygen or nitrogen gas.

Check that the compressor discharge is connected to a fill system suitable for 2300 psig and that there are no restrictions in the line.

Check that the compressor discharge is relieved of any pressure build-up.

Caution

Do not attempt to start the compressor against discharge pressure. Vent all gas pressure at the compressor discharge prior to starting. If the compressor stalls it is probably because there is residual pressure in the system.

Push the **Power On** rocker switch to the ON position.

Push the **Start** pushbutton, the compressor should come on. Verify that the compressor comes on and the **Start** pushbutton light is illuminated.

Periodically monitor the compressor for proper operation. Observe that there are no leaks or unusual noises. Make sure there is adequate air circulation around the compressor and that the location temperature where the compressor is operating does not exceed 110° F.

Compressor Shutdown
Press the On/Off rocker switch to the OFF position.

Oxygen compression equipment has very special requirements because of the hazards of explosion and fire associated with compressed oxygen. Rix recommends that only trained and qualified personnel work on this equipment. Rix recommends returning the compressor to Rix or to an approved Rix service center when repairs are to be made.

Simple operations such as repairing leaks or replacing valves or relief valves may be done locally by competent mechanics trained in working on oxygen equipment. Care must be taken when handling these parts so that surfaces in contact with oxygen do not become contaminated.

**Changing Suction and Discharge Valves (first and second stages)**

The compression valves are designed into the tube fittings for the first and second stages suction and discharge. These valves are not designed to be serviceable except by the factory. To replace a valve, remove the fitting nut and tube line and then remove the valve. When reinstalling a valve make sure that the O-ring is in place and is lightly lubricated with oxygen compatible grease such as Krytox®.

Valves are marked with an 'S' for suction and a 'D' for discharge. Make sure the proper valve is used when reinstalling. Do not interchange suction and discharge valves. Reinstall the tube line and tighten the nut as necessary to eliminate leakage. Use a soap type leak test fluid to check for leaks while the compressor is running. Tighten just enough to eliminate all leakage.

Caution

Do not over-tighten as this may damage the sealing surfaces making it more difficult to attain a leak-free joint.

# SERVICING

### Changing Suction Valve (third stage)

This suction valve is similar to the first and second stage suction valve but is marked "3S". It should not be interchanged with any other stage valve, but otherwise may be serviced in the same way as the suction valves for the first and second stages.

### Changing Discharge Valve (third stage)

The discharge valve is located under the hex plug on top of the third stage head. It is critically important to keep the internal parts from becoming contaminated and this valve should be serviced by personnel trained in handling oxygen systems. Lightly lubricate the small O-ring on the tip of the poppet with an oxygen compatible lubricant such as Krytox®.

### Changing Relief Valves

The relief valves are not meant to be serviced except by the factory. If it becomes necessary they may be replaced with new valves using care so that the surfaces in contact with oxygen do not become contaminated. The first and second stage relief valves are located on the side of the compressor. The third stage or final relief valve is located inside the base of the compressor.

### Setting The Pressure Switch

A pressure switch is located inside the base of the compressor and is factory set at 2200 psig. It is important that the set point never exceeds this pressure. If it becomes necessary to reset this switch it is accessible through a square shaped cutout in the plate covering the underside of the base. Push the sleeve on the body of the pressure switch back to expose the pressure adjustment mechanism. Insert a flat bladed tool such as a screwdriver in the slot and rotate the adjustment mechanism clockwise to increase pressure and counterclockwise to decrease it.

**Circuit breaker in Microboost base trips**
Likely causes:

1. A short circuit in the motor or electrical wiring.
2. A bearing is failing in the drive system.
3. A problem internal to the compressor or gearbox has increased the motor load.

**Thermal switch in motor trips** (note: this will reset automatically)
Likely causes:

1. Inadequate air circulation where the compressor is operating.
2. Motor current draw is high (see overload causes listed above).

**Relief valves leaks or relieves**
Likely causes:

1. A valve problem (either suction or discharge) in the next higher stage of compression.
2. A faulty relief valve (damaged seat or maladjustment).

**Low flow**
Likely causes:

1. A leak in a tube or pipe fitting on the compressor.
2. A leaking relief valve.
3. Worn piston seals in the compressor.

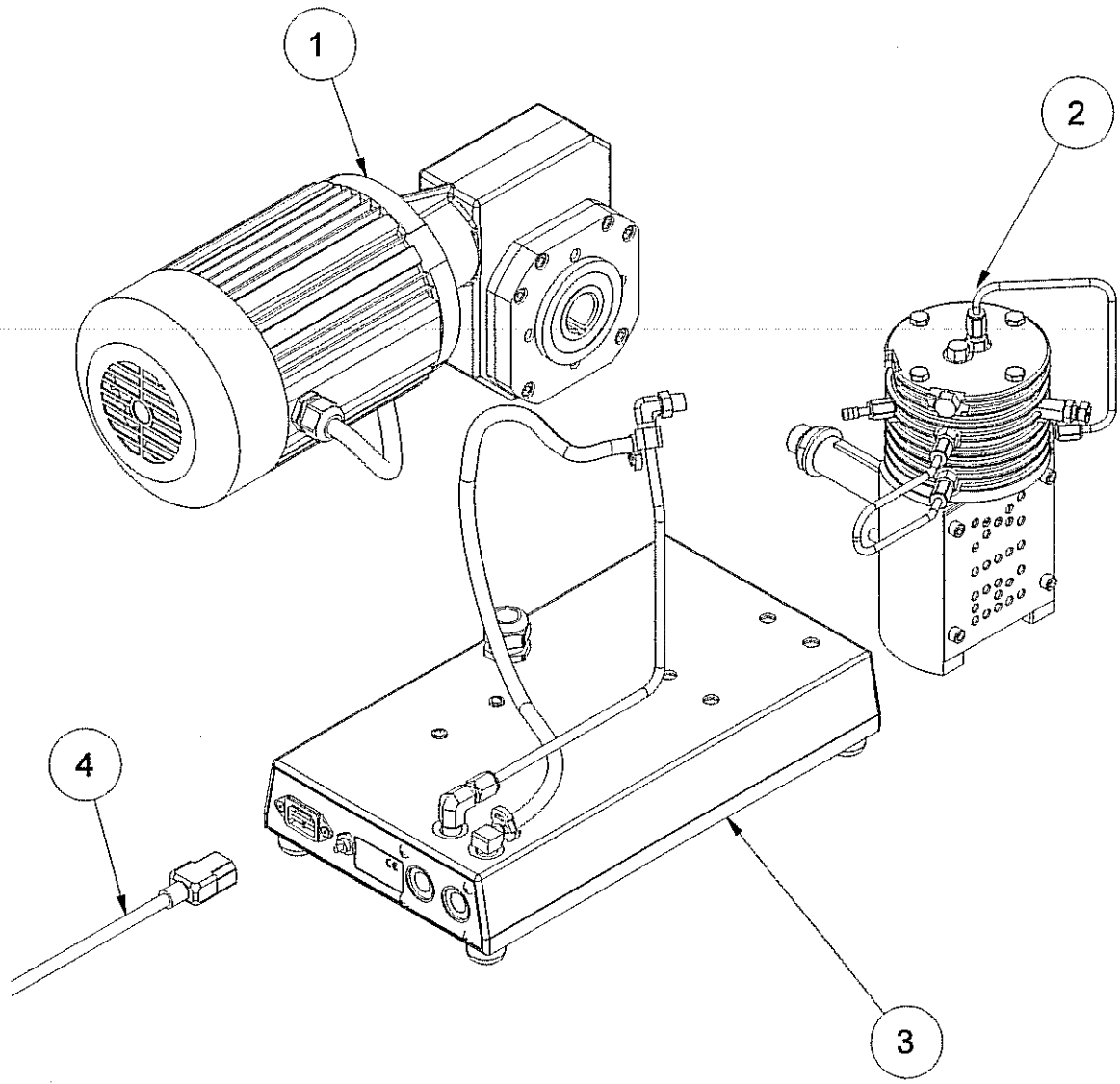
**Compressor stalls**
Likely causes:

1. Mechanical failure such as a bearing seizure.

**Compressor will not start**
Likely causes:

1. The compressor pressure is above the pressure switch setting.
2. The motor has overheated and tripped the thermal switch.
3. The circuit breaker tripped.

# PARTS BREAKDOWN



# PARTS BREAKDOWN

Compressor Assembly Major Components

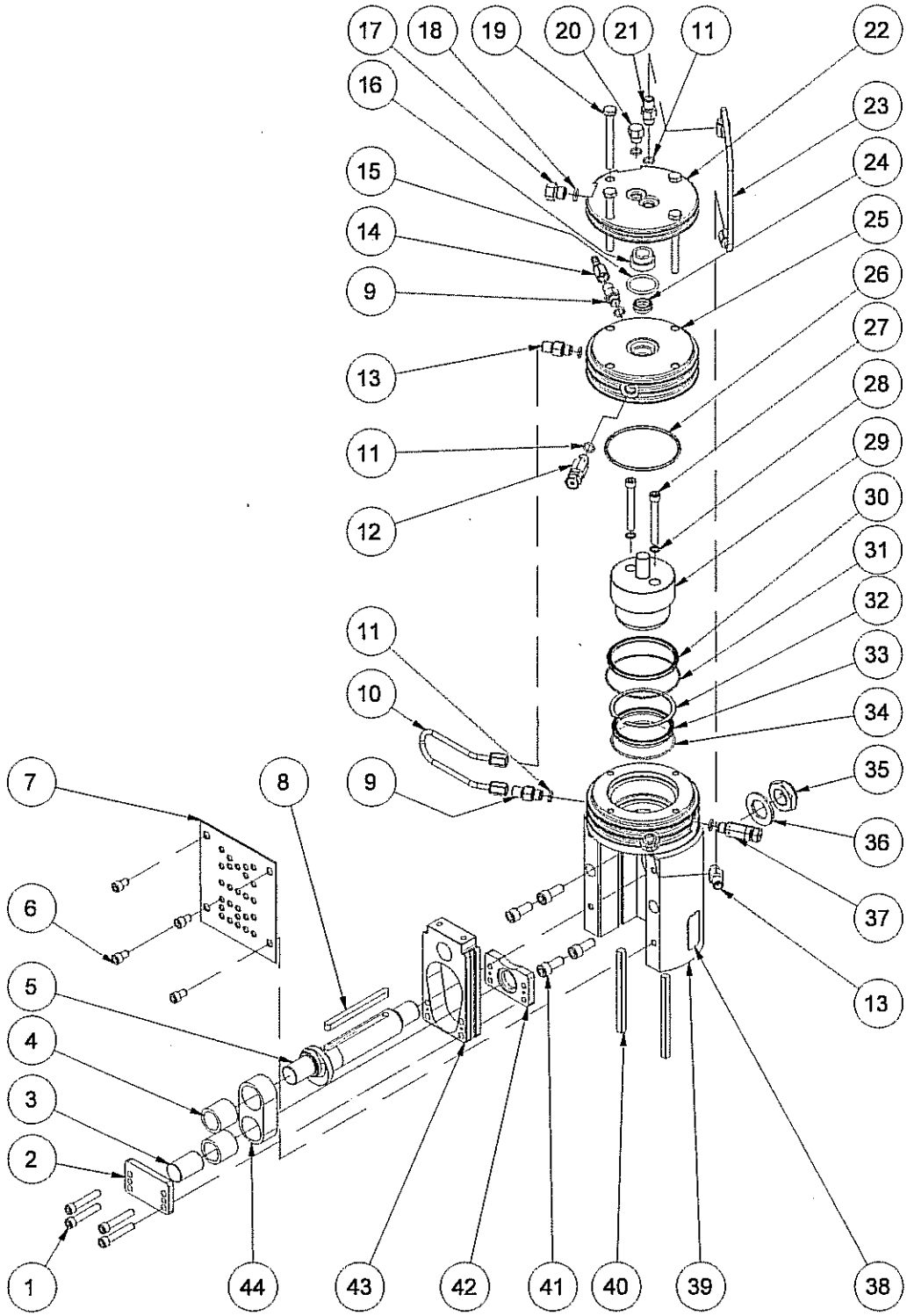
**MICROBOOST Model MB-D-115**
**115 V, 50/60 Hz**

| ITEM | QTY | PART NUMBER | DESCRIPTION | |
|---|---|---|---|---|
| 1 | 1 | 107-7309 | MOTOR/GEARBOX | |
| 2 | 1 | G100-MB-B | COMPRESSOR | (see separate parts list, page 17) |
| 3 | 1 | G200-MB-115-B | BASE | (see separate parts list, page 19) |
| 4 | 1 | 138-5777 | POWER CORD | |

**MICROBOOST Model MB-D-230**
**230 V, 50/60 Hz**

| ITEM | QTY | PART NUMBER | DESCRIPTION | |
|---|---|---|---|---|
| 1 | 1 | 107-7309 | MOTOR/GEARBOX | |
| 2 | 1 | G100-MB-B | COMPRESSOR | (see separate parts list, page 17) |
| 3 | 1 | G200-MB-230-B | BASE | (see separate parts list, page 19) |
| 4 | 1 | N/A | POWER CORD | (provided by customer) |

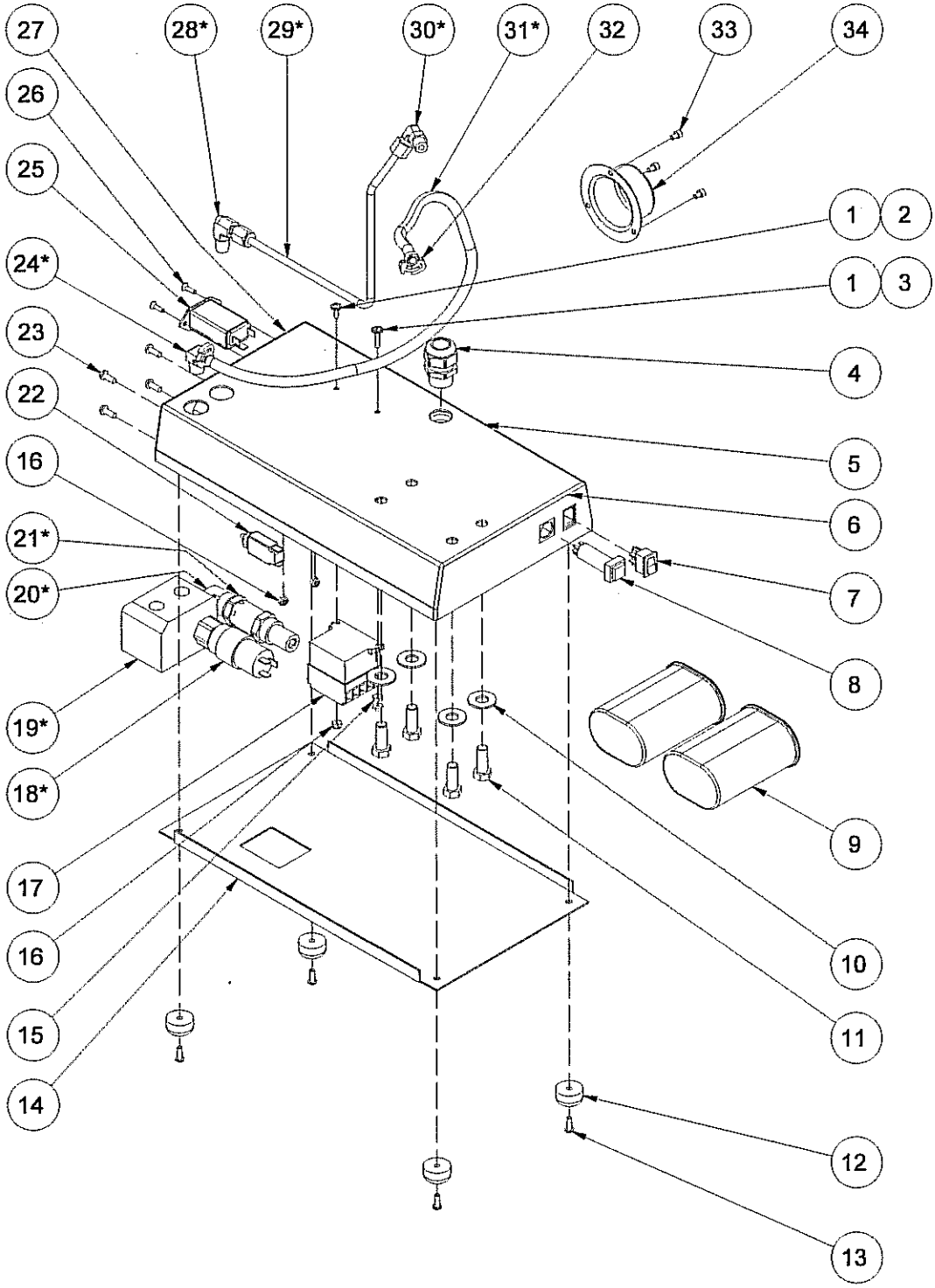
# PARTS BREAKDOWN



# PARTS BREAKDOWN

| Item | Part Number | Qty | Description |
|---|---|---|---|
| 1 | 32-A9020 | 4 | Bolt, Soc Hd, 1/4-28, 1 3/8L |
| 2 | 6-A8781 | 1 | Front Plate |
| 3 | 27-A8784 | 1 | Shaft |
| 4 | 181-5704 | REF | Needle Bearing (in item 44) |
| 5 | 5-C2974 | 1 | Crankshaft |
| 6 | 32-6040 | 4 | Bolt, Hex Hd |
| 7 | 38-A8941 | 1 | Plate, Cover |
| 8 | 91-A9262 | 1 | Key |
| 9 | XAS15-A8450 | 2 | Suction Valve, 1st, 2nd |
| 10 | XA455-B7146 | 1 | Tube Line assembly, 1st |
| 11 | X123-903-5 | REF | O-ring |
| 12 | XA515-A8448 | 1 | Relief Valve, 1st Stage |
| 13 | XAD15-A8451 | 2 | Discharge Valve, 1st, 2nd |
| 14 | XA54-A8595 | 1 | Fitting Assy, Inlet |
| 15 | X123-120-5 | 1 | O-ring, 3rd Stg Cylinder |
| 16 | X63-B7013 | 1 | Cylinder Liner, 3rd Stg |
| 17 | X54P-4P50NSS | 1 | Plug, 7/16 ST THD |
| 18 | X123-904-5 | 1 | O-ring, |
| 19 | 32-1175 | 4 | Bolt, Hex Hd |
| 20 | XAD15-A8576 | 1 | Discharge Valve, 3rd Stage |
| 21 | XAS15-A8594 | 1 | Suction Valve, 3rd Stage |
| 22 | X2-B7112 | 1 | Head, 3rd Stage |
| 23 | XA455-B8447 | 1 | Tube Line Assy, 2nd Stg |
| 24 | XA125-A9503 | 1 | Seal, 3rd Stage |
| 25 | X1-C2750-1 | 1 | Cylinder Block, 1st Stage |
| 26 | X123-146-5 | 1 | O-ring |
| 27 | X32-1151 | 2 | Bolt, Soc Hd, 1/4-20, 2L |
| 28 | X20-A8486 | 2 | Washer, Copper |
| 29 | X8-C2751 | 1 | Piston, Compression |
| 30 | XA125-A9501 | 1 | Seal, 1st Stage |
| 31 | X123-038-5 | 1 | O-ring, 1st Stage |
| 32 | X31-1003 | 1 | Snap Ring |
| 33 | XA125-A9502 | 1 | Seal 2nd Stage |
| 34 | X123-035-5 | 1 | O-ring, 2nd Stage |
| 35 | 53-70 | 1 | Nut, Nylok, 3/4-16 |
| 36 | 20-4862 | 1 | Washer, AN, 3/4, Steel |
| 37 | XA515-A8449 | 1 | Relief Valve, 2nd Stage |
| 38 | 62-A8993 | 1 | Label, Nameplate |
| 39 | A100-D3316 | 1 | Crankcase |
| 40 | 58-A8484 | REF | Guide (part of item 39) |
| 41 | 32-4038 | 4 | Bolt, Soc Hd, 5/16-18, 3/4L |
| 42 | 6-A8780 | 1 | Back Plate |
| 43 | 52-A8779 | 1 | Yoke |
| 44 | A7-A9290 | 1 | Connecting Rod Assy |

# PARTS BREAKDOWN



# PARTS BREAKDOWN

## Base Assembly

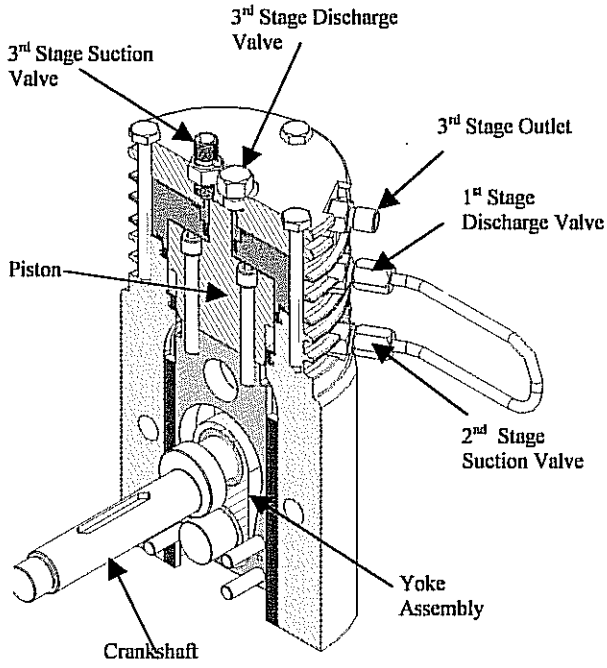
| Item | Part Number | Qty | Description |
|---|---|---|---|
| 1 | 20-4028 | 2 | Washer, #6, Zinc Pl. |
| 2 | 32-4169 | 1 | Bolt, Round Head, #6-32, 1/2L, Zinc Pl. |
| 3 | 32-6667 | 1 | Bolt, Round Head, #6-32, 3/4L, Zinc Pl. |
| 4 | 138-6148 | 1 | Cord Grip Fitting |
| 5 | 70-D3319 | 1 | Base Plate |
| 6 | 62-A8994 | 1 | Label, Front |
| 7 | 76-5470 | 1 | Rocker Switch |
| 8 | (see below) | 1 | Pushbutton, Lighted |
| 9 | 167-6955 | 2 | Capacitor |
| 10 | 20-4460 | 4 | Washer, 3/8, Zinc Pl. |
| 11 | 32-1046 | 4 | Bolt, Hex Head,3/8-16, 1L |
| 12 | 39-5751 | 4 | Rubber Bumper |
| 13 | 32-4555 | 4 | Bolt, Round Head, #8-32, 1/2L, Zinc Pl. |
| 14 | 38-C2837 | 1 | Coverplate, Base |
| 15 | 53-1035 | 2 | Nut, Hex, #6-32, Zinc Pl. |
| 16 | 53-30393 | 3 | Nut, Nylock, #6-32, Zinc Pl. |
| 17 | (see below) | 1 | Relay, 115V |
| 18 | X76-5659 | 1 | Pressure Switch |
| 19 | X10-B7562 | 1 | Manifold Block |
| 20 | X54P-1/4CDS | 1 | Street Elbow, 1/4 T |
| 21 | X515-61 | 1 | Relief Valve, 2400 psi |
| 22 | 163-7586 | 1 | Circuit Breaker |
| 23 | 32-4164 | 4 | Bolt, Round Head, #10-24, 1/2L, Zinc Pl. |
| 24 | X54P-229-64B | 1 | Hose Barb Elbow |
| 25 | 138-5707 | 1 | Electrical Connector |
| 26 | 32-1184 | 2 | Bolt, Flat Head, #6-32, 1/2L, SS |
| 27 | 62-A9334 | 1 | Label, Back |
| 28 | X54P-44CBUSS | 1 | Elbow, Male, 1/4 P |
| 29 | X455-B8446 | 1 | Tube Line, Discharge |
| 31 | X54P-4CBUSS | 1 | Elbow, Male, 1/4 T |
| 31 | X6-4340 | 1 | Hose, Inlet (20" L) |
| 32 | 79-6778 | 2 | Hose Clamp |
| 33 | 32-7804 | 3 | Bolt, Socket Head, #8-32, 1/4L, Bl. Oxide |
| 34 | 156-A9328 | 1 | Shaft Guard |
| 35 | 61-A9289 | 1 | Wire Kit (not shown) |

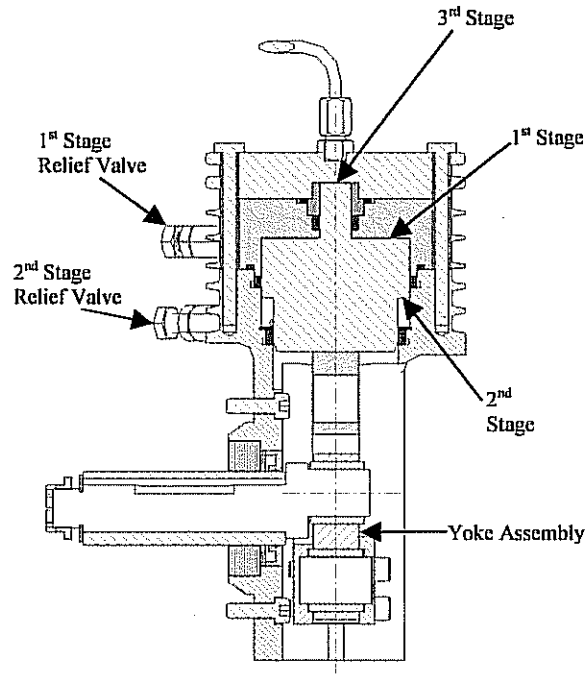
**Accessory Group 115 Volt**

| | | | |
|---|---|---|---|
| 8 | 76-5657 | 1 | Pushbutton, Lighted, 115 V |
| 16 | 76-5655 | 1 | Relay, 115V |

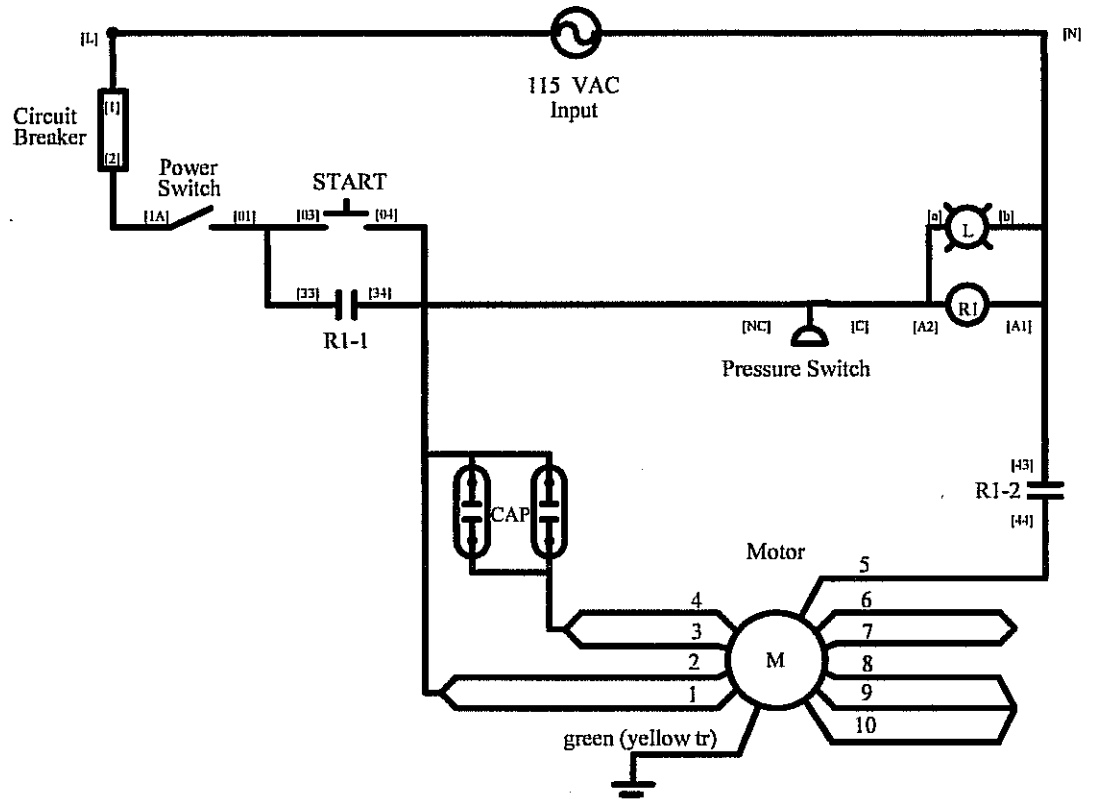
**Accessory Group 230 Volt**

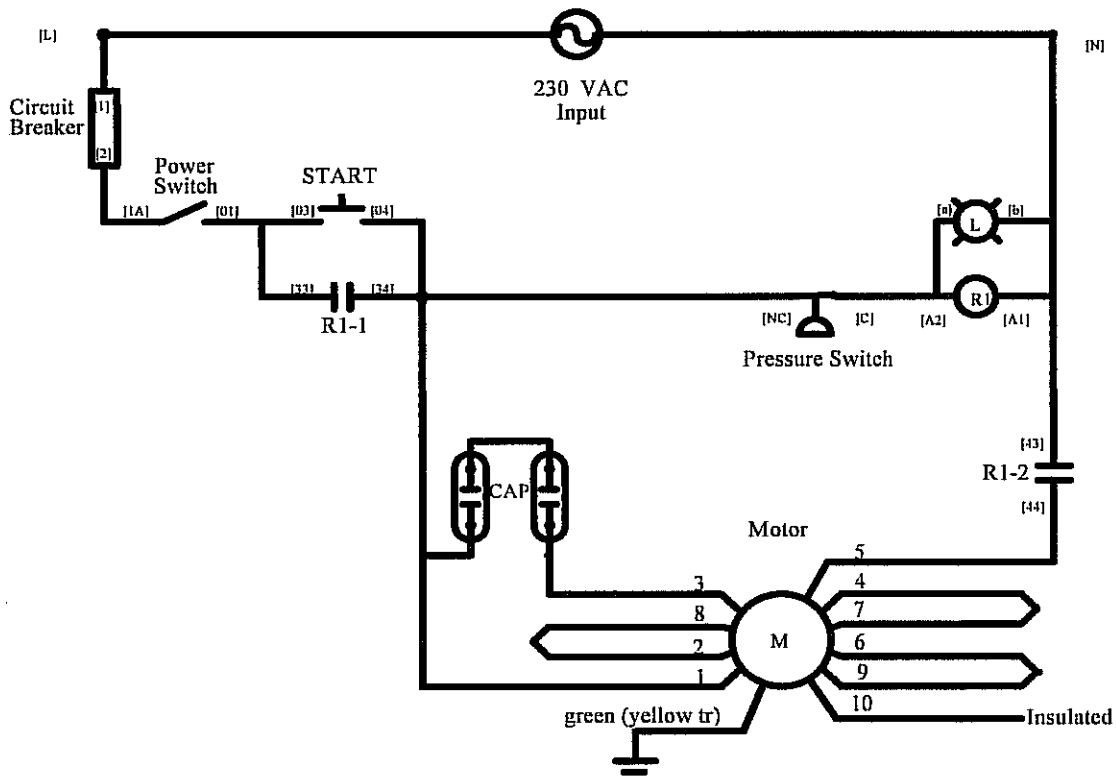
| | | | |
|---|---|---|---|
| 8 | 76-5658 | 1 | Pushbutton, Lighted, 230 V |
| 16 | 76-5656 | 1 | Relay, 230V |




Compression occurs in three stages, all configured on a single stepped piston. The first stage is 2.375 inches in diameter and compresses on the upstroke discharging at a pressure about 250 psig. The second stage is located directly under the first stage and has a diameter of 2.00 inches compressing on the downstroke at a pressure of about 900 psig. The third stage is .500 inches in diameter located above the first stage and compresses on the upstroke to the final discharge pressure of 2,200 psig. Each stage is provided with an inlet valve and a discharge valve. These one-way poppet valves control the direction of gas flow from stage to stage. Relief valves are also provided on each stage to prevent overpressurization in the event of a poppet valve failure. The heat generated during compression is removed in the cylinder block, which has a relatively large thermal mass and cooling fins. Peak gas temperatures are held under 250 °F. A discharge pressure switch shuts the compressor down when the pressure reaches the switch set pressure, usually 2,200 psi.


[L]
[N]
115 VAC
Input
Circuit
Breaker
[1]
[2]
Power
Switch
START
[1A]
[01]
[03]
[04]
[a]
[b]
L
[33]
[34]
R1
R1-1
[NC]
[C]
[A2]
[A1]
Pressure Switch
[43]
R1-2
[44]
CAP
Motor
5
4
6
3
7
2
M
8
1
9
10
green (yellow tr)


[L]
[N]
230 VAC
Input
Circuit
Breaker
[1]
[2]
Power
Switch
START
[1A]
[01]
[03]
[04]
[a]
[b]
L
[33]
[34]
R1
R1-1
[NC]
[C]
[A2]
[A1]
Pressure Switch
[43]
R1-2
[44]
CAP
Motor
5
3
4
8
7
2
M
6
1
9
10
green (yellow tr)
Insulated